



The Greening of Guantanamo

Story by MC3 Leona Mynes

When you arrive at Naval Station Guantanamo Bay, Cuba, one of the first sights visitors, new residents, and returning residents see are four 262-ft. tall, three-blade wind turbines atop John Paul Jones Hill, the highest point on the 45-sq. mile base.

The turbines typically produce between 2 to 4 percent of the base's electric energy per day. This saves the Navy from purchasing more than 250,000 gallons of diesel fuel per year. The turbines are the most noticeable symbols of the base's quest to conserve energy.

In 1964, just three years after the U.S. broke diplomatic relations with Cuba, Rear Adm. John D. Bulkeley, commander of Guantanamo Bay Naval Base, watched as a chunk of pipe was cut out of the ground near Cuban territory after Cuba's government claimed the base was stealing its water, even though Cuba had already cut off the base's water supply.

Following that claim, water was carried via barge to the base, while a steam-powered desalinization plant and a power plant were being built and implemented.

In FY10 alone, those water and electricity plants produced more than 3.4 million gallons of water and 350,000 kilowatt hours of electricity per day, supporting more than 6,000 service members, their families and civilian contractors residing aboard Guantanamo Bay. The original desalinization plant has been replaced with an energy-efficient 1.5 million gallons per day reverse osmosis plant and a 580,000 kilowatt hour diesel generating plant.

Because of its need to be self-sufficient to support its residents and its mission, Guantanamo is the most expensive base to power in the Navy's Southeast region.

The base has an Americanesque small town glow nestled in a pristine Caribbean environment, and its human population cost the Navy more than \$36 million in FY10 for electric power alone. To reduce that number and fall in line with federal mandates for energy conservation, Guantanamo is taking steps toward a greener future, using its unforgiving sun and sweeping winds as resources.

Constructed in 2004, the four wind turbines marked the beginning of a new mindset for energy conservation and reduced energy consumption for base residents, facilities and commands.

In 2009, a fleet of hybrid vehicles was introduced to the base, that allows members conducting official business to navigate the base using fewer gallons of gasoline. Low-flow shower heads, installed in housing and in barracks around the base, reduced water flow during showers from 2.5 to 1.5 gallons per minute.

By 2010, a waste oil-to-energy converter (WOTEC) was installed. The system blends used oil from generators and visiting ships with diesel fuel for the generators in the power plant.

In FY11, the Public Works Department (PWD) will install two new fuel-efficient 3.5-megawatt generators to reduce diesel consumption by 408,000 gallons per year. Eventually, all power plant generators will be replaced by newer, fuel-efficient generators.

"In Guantanamo, as you reduce energy consumption, you get more 'bang for your buck' than other bases in this region," said Cmdr. Wendy Halsey, Guantanamo Bay's public works officer. "This is due to our high utility rates that are four times greater than other Southeast region naval installations."

To reduce base energy consumption, PWD began replacing approximately one-third of the 17 miles of lights along the perimeter fence with Cuba with solar-powered light-emitting diode (LED)

lights. Low-wattage LED street lights currently span more than half of the base's main roads as well as snake through base neighborhoods as an alternative to high-wattage halogen street lights.

"We estimate that the solar-powered fence line lights are about 1 percent of the base's total energy use," said Lt. Jonathan Chafauros, Guantanamo Bay's assistant public works officer.

PWD has installed 151 energy-measuring meters on large or high-energy use buildings, allowing consumption information to be recorded electronically and compiled into data sheets and graphs for base officials, who will use the information to set a goal for reduction in energy consumption.

"It's not just a region priority or a Department of the Navy priority," said Halsey. "It's a DoD policy to do all we can to control consumption and promote a culture of conservation."

The culture of conservation rippling through Guantanamo culminated into a proactive approach to new construction projects on base. In April 2011, a military construction (MILCON) project to expand the base fitness center by mid-2013 began. It includes plans to construct and use a 0.4 megawatt solar array that will power the facility. In addition to wind and solar power, PWD is looking at biodiesel fuel as an alternative to high levels of oil consumption on base.

Biodiesel fuel would be part of the base's initiative if it were to become a net-zero base.

"Net-zero means all of your power is created by renewable energy sources. It's considered 'green' energy," said Halsey. "If we were ever to become a net-zero base, we would have to use biodiesel fuel, solar power, and continue to reduce our consumption."

PWD's ultimate goal is to move away from petroleum-based diesel fuel, and wind and solar power have no negative effect on the environment or harmful emissions.

"You're never going to make diesel power cleanly," Halsey said. "As we get away from diesel fuel at our power plant, we get away from harmful emissions."

Although PWD and other base entities can contribute to a culture of conservation on Guantanamo, the most important factor is individual effort.

"All of the projects we're doing are great for this [greening of Guantanamo]," Halsey said, "But ultimately, you have to get the user concerned about how much energy they're using."

To make residents more aware of their energy use, people living in base neighborhoods will receive mock electricity and water bills from the housing office. The mock billing will show residents who pay no utility bills how much they cost the Navy per month.

"When I wake up, I get the kids to school, and I go cut off every light and unplug what can be unplugged and leave," said Chafauros.

"If everyone did that, we could save 2 percent [of energy consumption] just from housing."

Chafauros championed building energy monitor training, teaching one person from each building that seemingly insignificant energy conservation precautions can be taken, such as turning off computer monitors and ensuring the number of refrigerators and coffee makers per person remains low.

"These are small steps, but they are steps forward to a greener future," said Chafauros. "We have to make residents want to conserve. The mock billing is really a must, because when people are paying their bills, they're very conscious of what they consume."

Guantanamo is directed to reduce energy consumption by 3 percent in 2011 from FY10 levels.

"But I think we're going to exceed that," said Halsey. "We have limited natural resources that we should be using in the best way possible. 'It's more than a federal mandate — using our resources better is a moral imperative.' AH

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